

03050109-190
(Saluda River/Lake Murray)

General Description

Watershed 03050109-190 is located in Newberry, Saluda, Lexington, and Richland Counties and consists primarily of the *Saluda River* and its tributaries from the Lake Murray headwaters to the dam. The watershed occupies 150,881 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Tatum-Georgeville-Herndon-Lakeland series. The erodibility of the soil (K) averages 0.28; the slope of the terrain averages 7%, with a range of 2-25%. Land use/land cover in the watershed includes: 2.89% urban land, 12.88% agricultural land, 1.82% scrub/shrub land, 0.08% barren land, 53.04% forested land, 0.72% forested wetland (swamp), and 28.57% water.

The Saluda River watershed (03050109-150) and the Little Saluda River watershed (03050109-170) merge to form the headwaters of Lake Murray. Spring Creek, Hawleek Creek, Rocky Creek (Whetstone Creek), and Buffalo Creek flow into the waters of upper Lake Murray. Camping Creek (Susannah Branch, Snap Branch), Stevens Creek (Millers Branch), and Bear Creek (Rocky Branch, Stinking Creek) enter midlake on the northern shore, and the Hollow Creek watershed (03050109-200), Horse Creek (Little Horse Creek), Little Hollow Creek, Beaverdam Creek, Rocky Creek (Clemons Branch), Beech Creek, and Twentymile Creek enter midlake on the southern shore of the lake. Eighteenmile Creek drains into the lake near the dam. Lake Murray is owned and operated by SCE&G Company and is used for power production, recreation, and water supply. There are also several small ponds (10-18 acres) in the watershed used for recreation. Billy Dreher State Park, located midlake on Billy Dreher Island is another natural resource in the watershed. There are a total of 58.3 stream miles (tributaries of Lake Murray), all classified FW.

Water Quality

<u>Station #</u>	<u>Type</u>	<u>Class</u>	<u>Description</u>
S-808	BIO	FW	TRIBUTARY TO LAKE MURRAY AT SR 408
S-279	P	FW	LAKE MURRAY AT MARKER 63
S-211	S	FW	LAKE MURRAY, HOLLANDS LANDING OFF S-36-26
S-212	S	FW	LAKE MURRAY, MACEDONIA LANDING AT END OF S-36-26
S-290	P	FW	CAMPING CREEK S-36-202 BELOW GA PACIFIC
S-850	BIO	FW	CAMPING CREEK AT SR 72
S-213	S	FW	LAKE MURRAY AT S-36-15
S-280	P	FW	LAKE MURRAY AT MARKER 102
S-273	P	FW	LAKE MURRAY AT MARKER 166
S-274	P	FW	LAKE MURRAY AT MARKER 143
S-204	P	FW	LAKE MURRAY AT DAM AT SPILLWAY (MARKER 1)

Lake Murray - Lake Murray is a 51,000-acre impoundment on the Saluda River, with a maximum depth of approximately 57.8m and an average depth of approximately 12.6m. The lake's watershed comprises 3059.6km². Eutrophication assessments indicate that, overall, Lake Murray is among the least eutrophic of large lakes in South Carolina. A site in the upper end of the lake (S-279), however, is among the most eutrophic sites in large South Carolina lakes, characterized by high densities of algae. Watershed management is recommended to reduce phosphorus loading to this area of the lake. Treatment for *Hydrilla* in selected areas of Lake Murray (84 acres) began in 1993 by the Water Resources Division of the SCDNR to provide public access. In 1994, 980 acres were treated with herbicides, and 1,332 acres were treated in 1995, 1,098 acres in 1996, and 182 acres in 1998. Better control is seen in the protected coves than in more open waters.

There are eight monitoring sites along the main body of Lake Murray. At the furthest uplake site (S-279), aquatic life uses are not supported due to occurrences of copper in excess of the aquatic life acute standards and eutrophication. In addition, there were very high concentrations of chromium and lead measured in 1996, and a significant increasing trend in turbidity. In sediment, high concentrations of chromium, copper, lead, nickel, and zinc were measured in 1994, and a high concentration of copper was measured in 1995. P,P'DDE (a metabolite of DDT) and malathion (a pesticide) were also detected in the 1994 sediment sample. Although the use of DDT was banned in 1973, it is very persistent in the environment. A significant increasing trend in dissolved oxygen concentration and a significant decreasing trend in total phosphorus concentration suggest improving conditions for these parameters. Recreational uses are fully supported, but there is a significant increasing trend in fecal coliform bacteria concentration.

Aquatic life and recreational uses are fully supported at S-211, and a significant decreasing trend in total phosphorus concentration suggests improving conditions for this parameter. At S-212, aquatic life uses are fully supported, but there is a significant increasing trend in turbidity. A significant increasing trend in dissolved oxygen concentration and a significant decreasing trend in total phosphorus concentration suggest improving conditions for these parameters. Recreational uses are fully supported. Aquatic life and recreational uses are fully supported at S-213, and significant decreasing trends in five-day biochemical oxygen demand and total phosphorus concentrations suggest improving conditions for these parameters.

Aquatic life uses are not supported at S-280 due to occurrences of copper in excess of the aquatic life acute standards. A very high concentration of chromium was measured in the 1994 sediment sample. A significant decreasing trend in total phosphorus concentration suggests improving conditions for this parameter. Recreational uses are fully supported at this site, but there is a significant increasing trend in fecal coliform bacteria concentration.

Aquatic life uses are also not supported at S-273 due to occurrences of copper in excess of the aquatic life acute standards. Very high concentrations of chromium, lead, and nickel, and high concentrations of copper and zinc were measured in the 1994 sediment sample. Also in sediments, P,P'DDE was detected in the 1994 and 1996 samples. A significant increasing trend in dissolved oxygen concentration and significant decreasing trends in total phosphorus and total nitrogen concentrations and turbidity suggest improving conditions for these parameters. Recreational uses are fully supported, but there is a significant increasing trend in fecal coliform bacteria concentration.

At S-274, aquatic life uses are not supported due to occurrences of copper in excess of the aquatic life acute standards. A very high concentration of mercury was measured in the 1993 sediment sample, and a high concentration of copper was measured in 1996. Also in sediments, P,P'DDE and O,P'DDT were detected in 1993, and P,P'DDD was detected in 1995. A significant increasing trend in dissolved oxygen concentration and significant decreasing trends in total phosphorus and total nitrogen concentrations and turbidity suggest improving conditions for these parameters. Recreational uses are fully supported, but there is a significant increasing trend in fecal coliform bacteria concentration.

Aquatic life uses are partially supported at S-204 due to occurrences of copper in excess of the aquatic life acute standards. A high concentration of nickel was measured in the 1994 sediment sample, high concentrations of chromium, copper, and lead were measured in 1995, and a high concentration of copper was measured in 1996. Also in sediments, P,P'DDE was detected in 1993 and 1995, and

P,P'DDD and a-BHC were detected in 1995. Significant decreasing trends in total phosphorus and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are fully supported, but there is a significant increasing trend in fecal coliform bacteria concentration.

Proposed "No Discharge" Designation for Lake Murray

The Department is considering prohibiting the discharge of sewage from boats into Lake Murray. The waters of Lake Murray are important from both an economical and recreational standpoint. The lake is owned by the South Carolina Electric and Gas (SCE&G) Company, and is a reliable source of drinking water for the Cities of Columbia and West Columbia which maintain water intakes. Although present water quality is good, the Department is concerned about the potential for future water quality degradation and believe that measures are needed to insure that present water quality is maintained. The proposal to prohibit the discharge of sewage from marine toilets has the support of the Lake Murray Association and members of the State Legislature.

Federal water quality standards prohibit the discharge of untreated sewage into the navigable waters of the United States. But sewage from marine toilets on boats is permitted provided it has undergone some disinfection and treatment. For certain waterbodies, like Lake Murray, federal regulations allow states to designate them as "no discharge" to prohibit even treated discharges from boats. If the USEPA agrees to the no discharge designation, the Department will require protection beyond the federal minimum standard and all boats with marine toilets would no longer be allowed to discharge treated sewage into the lake. Instead, boats will have to pump-out their holding tanks at any of the 7 marinas the Department has identified as having pump-out, treatment, and disposal capabilities. A final decision is expected in 1999.

Tributary to Lake Murray (S-808) - Aquatic life uses are fully supported based on macroinvertebrate community data.

Camping Creek - There are two monitoring sites along Camping Creek. At the upstream site (S-290), aquatic life uses are not supported due to occurrences of copper and zinc in excess of the aquatic life acute standards, including a high concentration of zinc measured in 1993. In addition, there were very high concentrations of chromium and lead measured in 1993. Significant decreasing trends in five-day biochemical oxygen demand and total phosphorus and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions. At the downstream site (S-850), aquatic life uses are fully supported based on macroinvertebrate community data.

Permitted Activities

Point Source Contributions

<i>RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD) COMMENT</i>	<i>NPDES# TYPE LIMITATION</i>
LAKE MURRAY SCDPRT/DREHER ISLAND PIPE #: 001 FLOW: 0.06 WQL FOR NH3-N, DO, BOD5	SC0026948 MINOR DOMESTIC WATER QUALITY
CAMPING CREEK NEWBERRY COUNTY W&SA/PLANT 2 PIPE #: 001 FLOW: 0.03 WQL FOR NH3-N, DO, TRC, BOD5	SC0044741 MINOR MUNICIPAL WATER QUALITY
STEVENS CREEK MII-DERA GARDEN APTS PIPE #: 001 FLOW: 0.0144 WQL FOR NH3-N, DO, TRC	SC0032042 MINOR DOMESTIC WATER QUALITY
<i>LAND APPLICATION FACILITY NAME</i>	<i>PERMIT # TYPE</i>
SPRAY IRRIGATION BEDFORD WAY/NCW&SA	ND0062219 MINOR MUNICIPAL
TILE FIELD MALLARD BAY SD/AAA UTIL.	ND0019640 MINOR COMMUNITY
SPRAYFIELD BEDFORD WAY	ND0060577 MINOR COMMUNITY
LOW PRESSURE IRRIGATION SYSTEM SMALL WOODS SD/CAROLINA WATER	ND0007994 MINOR COMMUNITY

Nonpoint Source Contributions

Bush River/Camping Creek Watershed Study

This was a comprehensive watershed project in a predominantly agricultural watershed. The project was being implemented with several cooperating agencies, with the SCDNR as the lead agency. The project area lies mostly in Newberry County and the watershed drainage is to Lake Murray. The project began in 1990 and concluded in August of 1998. The project provided funding for technical and financial assistance to farmers in the watershed for BMPs related to rowcropping and confined animal operations. Innovative BMP demonstrations funded by the project included provision of manure nutrient testing by a mobile laboratory, portable animal waste lagoon pumpout and spray irrigation equipment available for rent by farmers in the watershed, and effective pesticide management.

Camp Facilities

<i>FACILITY NAME/TYPE RECEIVING STREAM</i>	<i>PERMIT # STATUS</i>
EPTING CAMP/FAMILY BEAR CREEK/LAKE MURRAY	32-307-0015 ACTIVE
DREHER STATE PARK/FAMILY CAMPING CREEK/LAKE MURRAY	36-307-36014 ACTIVE
HOLLANDS LANDING/FAMILY LAKE MURRAY	36-307-36011 ACTIVE
HARRIS LANDING/FAMILY BUFFALO CREEK/LAKE MURRAY	36-307-36013 ACTIVE
PUTNAMS LANDING/FAMILY BEAR CREEK/LAKE MURRAY	32-307-0018 ACTIVE
LAKE MURRAY FAMILY CAMPGROUND/FAMILY HORSE CREEK/LAKE MURRAY	32-307-0014 ACTIVE
P&L CAMP/FAMILY LAKE MURRAY	36-307-36012 ACTIVE

Water Supply

<i>WATER USER (TYPE) WATERBODY</i>	<i>REGULATED CAPACITY (MGD) PUMPING CAPACITY (MGD)</i>
CITY OF COLUMBIA (M) LAKE MURRAY	55.0 75.0
CITY OF WEST COLUMBIA (M) LAKE MURRAY	6.0 12.0

Growth Potential

There is and will be continued growth in areas bordering and surrounding Lake Murray. The widening of US 378 to four lanes has increased the expansion rate along the Lexington side of the lake. US 76 runs along the opposite shoreline of the lake, as does a rail line. The widening of I-26 toward the Chapin\Pomaria Exit is encouraging growth on both sides of the interstate.

Residential development continues to grow within the lake region. The area around the dam is the most developed and has water and sewer. The Richland County portion of the lake is also well developed and has several residential subdivisions where water and sewer are available. A study has been prepared and the findings are currently being reviewed to determine the feasibility of providing sewer service to areas surrounding Lake Murray within the 208 management areas of the Town of Chapin, the City of Columbia, Richland County, the Town of Lexington, and the Lexington County Joint Municipal Water and Sewer Commission (those portions of Lexington and Richland Counties bordering the lake). This will facilitate continued development along the shoreline as well as development along US 378. SC 6 is undergoing a corridor study, and the portion crossing the dam (and the dam itself) will be widened. The City of Columbia and Lexington County are currently in the discussion phase in working together to solve

Lexington County's water and sewer needs.

The upper lake region in Newberry County is primarily rural: a few small subdivisions, some industry, and agricultural activities on a small scale. The Town of Prosperity is serviced by the Newberry County Water and Sewer Authority, which discharges into Bush River. Bush River continues to be limited in terms of assimilative capacity, and as such there has been discussion among various sewer providers in the county for a larger regional facility which would discharge within this watershed, as well as some discussion for a single entity water and sewer provider for the lower part of Newberry County.

Lake Murray, as the main water-based recreational resource in the region, draws millions of visitors annually to its numerous parks, recreational areas, and waterways. All aspects of growth surrounding Lake Murray (tourist industry, residential development, agricultural activities) are expected to continue.